NEWS News

Experts relatively unfazed by drugs in drinking water

Apr. 11, 2008 02:10 PM McClatchy Newspapers

WASHINGTON - Lots of people lunged for bottled water after they were told last month that tap water in many U.S. cities contains traces of pharmaceuticals.

"They wanted five-gallon bottles, half-liter cases - anything that wasn't municipal water," said Jennifer Brandon, who was taking phone orders for home-delivered Deer Park water the day the Associated Press story broke.

Responding to the public alarm, Sens. Barbara Boxer, D-Calif., and Frank Lautenberg, D-N.J. called for a hearing on the federal response to drugs in drinking water, now set for Tuesday.

Despite the sudden clamor, however, many water-quality researchers kept doing what they had done for years about contaminants in tap water: nothing. They kept drinking local tap or well water, a half-dozen of them told McClatchy Newspapers.

For one thing, they knew that bottled water is less regulated than municipal supplies are. The big reason, however, was that researchers were less anxious than senators and a public jolted by another new environmental scare for which risk and remedy are both unknown.

Goodness knows, there are lots of reasons to worry about the safety of drinking water.

Contaminants now commonly found in drinking water include tiny traces of pesticides, herbicides, flame retardants, DEET, mosquito repellant, aircraft de-icers, lead, arsenic, mercury and esters, ketones and other chemicals found in personal care products. Not to mention additives in toothpaste meant to retard gum and tooth disease.

The unending list of contaminants in water and elsewhere - now often called "micro-constituents" to scrub off the old word's onus - is a growing public burden. Asked if they faced more health risks than past generations, majorities of Americans polled in 1980 said yes. Asked a similar question in 2003, they said yes again.

So why are experts relatively unfazed? Here are a handful of reasons:

• Improved detection technology means that we're concerned about levels of contamination that were undetectable in years past.

In the 1970s, the best detection technology picked up compounds at concentrations of one part per million. Today, concentrations of one part per trillion or even quadrillion are detectable.

With each zero of added sensitivity, "myriads of other chemicals are evident," in water, said Christian Daughton, a research scientist at the Environmental Protection Agency's National Exposure Research Laboratory in Las Vegas. Among them are many of the drugs now reported in drinking water.

Given today's levels of detection, Daughton continued, what we consider to be clean drinking water resembles "a chemical sea of human-made chemicals and chemicals manufactured by the environment."

That's alarming to a public whose definition of a trace hasn't changed since the 1970s and whose ideal,

http://www.azcentral.com/news/articles/2008/04/11/20080411water-scare0411-ON.html

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Daughton said, remains "pure" water. "It's a tremendous problem when you're interpreting risk for the public." he said.

What causes his problem, however, is an unjustified worry. As Greg Kail, spokesman for the American Water Works Association in Denver, put it: "Just because you get a bigger telescope, that doesn't mean there are more stars in the sky. And better detection in water doesn't mean that the risk has increased."

• Even poisons are not always toxic.

Toxicology's most basic principle, researchers explained, is the maxim that "the dose makes the poison." One margarita is fine for most people, in other words, but 10 could be fatal, depending on vulnerability and timing.

Toxicologists apply this principle to all poisons, but the public doesn't, according to a landmark 1991 study that examined differences in how the two groups regard risks. Its lead author was University of Oregon psychology professor Paul Slovic, the founder of Decision Research Inc., a think tank for risk assessment based in Eugene, Ore.

According to Slovic, people take an "all or none" view of toxicity when it comes to unwanted exposures. Unlike the government, academic and industry toxicologists he surveyed, they ignore key hazard factors such as concentration, exposure and dose. Nearly nine out of 10 lay persons, for example, told Slovic's interviewers that if exposed to a toxic chemical, you're likely to get sick. (Two-thirds of toxicologists disagreed.)

"What's critical to understand is that it's the dose that's important," said Daughton. "Just because a toxic substance is around, doesn't mean you're exposed to it. Your body has to come in contact with it. Your body has to absorb it. Your exposure has to be of some duration and during a critical period of time."

• Effects on animals may not predict effects on humans.

In Slovic's study, two-thirds of lay people believed that a substance that causes cancer in animals is reasonably sure to cause cancer in humans. (Six in 10 toxicologists disagreed.)

In the case of drugs in water, reproduction in fin- and shellfish and amphibians seems to be the most affected, and the suspected culprits are natural and synthetic forms of the female hormone estrogen and substances that mimic them. In a widely cited experiment, fish in an otherwise pristine Canadian lake lost reproductive vitality when they are exposed to under six parts per trillion of a commonly used synthetic form of estrogen.

The findings "raise a red flag" about other effects these drugs may be having on wildlife and possible risks to humans, said Karen Kidd, an environmental toxicologist at the University of New Brunswick's Canadian Rivers Institute who led the study.

But it is important to realize, Kidd said, that estrogens are rarely found in drinking water. Moreover, one reason fish are affected is because they're always taking up compounds through their gills. Hence, "they're getting exposed to more drugs than the average human would be from drinking water," she said.

No research has found a hazard to humans from estrogen or any other pharmaceutical in drinking water, Kidd and others noted, and Kidd said she continues to drink tap water.

• Scientists understand big numbers and use them to gauge risk. Most other people get lost in the zeroes.

"There's no evolutionary reason for them to understand very big or very small numbers," said Ellen Peters, a colleague of Slovic's at the University of Oregon and at Decision Research.

"Our ancestors knew the number in their families and their villages," she said, "but those numbers were more like a few and up to 50 or 100."

Even now, people have so little real feel for millions and billions that they often confuse them.

When faced with a probability like one chance in a million, Peters and others said, most people glom onto the "one" and exaggerate its importance. That works well for lottery operators, because people overestimate their chances of winning. But it works badly for understanding health risks, Peters said, because people overestimate their vulnerability.

She suggests describing one in a million as a 0.000001 chance. Six more zeroes and you've got the concentration of estrogen in Kidd's lake.

Most people think irrationally about risks.

According to David Ropeik, a risk communication consultant based in Boston, people feel less threatened by health risks that they choose, such as smoking, than by risks that are imposed on them, such as contaminated drinking water. They accept familiar risks, such as riding a bicycle, more than risks that surprise them. They also tolerate visible risks, such as choppy seas, better than invisible ones, according to Ropeik. Drugs in drinking water earn mistrust on all those counts.

• News accounts of new environmental risks often overstate them.

The Associated Press investigative report in March, for example, waited roughly 1,000 words before telling readers: "Many independent scientists are skeptical that trace concentrations will ultimately prove to be harmful to humans."

The report also referred to "traces" of contaminants that were "far below the levels of a medical dose" and "in quantities of parts per billion or trillion," but it never defined these levels in ways that readers might better understand them. The stories also didn't mention the role played by improved detection technology in exposing new contaminants.

According to Ropeik, "the series played down the ameliorating facts."

Richard Pienciak, the series' editor, referred a request for comment to Paul Colford, the AP's director of media relations.

Colford said the story contained ample cautions against overreaction. Many government and academic researchers, he added, "are thanking AP for sounding an alarm and bringing the situation to the attention of millions of Americans."